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**BIOLOGICAL WEAPONS--  
THE POOR MAN'S NUKE**

by

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A RESEARCH REPORT SUBMITTED TO THE FACULTY  
IN  
FULFILLMENT OF THE CURRICULUM  
REQUIREMENT

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## **ABSTRACT**

TITLE: The Poor Man's Nuke

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Biological warfare is one leg of the triad of weapons of mass destruction (coupled with nuclear and chemical weapons). Biological weapons pose a significant threat to the United States military and public population across the spectrum of conflict. There is, however, little common knowledge of the insidious yet devastating potential of these weapons. This paper is written for the lay (that is non-technical) reader, outlining the history, threat, and possible countermeasures related to biological warfare agents. The intent is to heighten the awareness level regarding biological warfare as a military and terrorist threat.

## **BIOGRAPHICAL SKETCH**

Lieutenant Colonel Terry N. Mayer (MBA, Chapman College) is a Master Navigator with over 3,000 hours in HC-130, VC-135, and VC-137 aircraft. In addition, he has served staff tours at every echelon from wing to air staff in various capacities including combat rescue operations, personnel, special technical plans, requirements, and executive officer. During the Gulf War, he was initial cadre on the Checkmate planning cell in the basement of the Pentagon. As part of the unconventional planning effort, Lt Col Mayer was instrumental in conceiving and planning the DESERT STORM deception effort as well as other unconventional areas, especially those associated with more technical aspects of the war. In mid-December, Lt Col Mayer was drafted by Defense Intelligence Agency to lead a tiger team charged with finding a method of conducting a preemptive strike against Iraqi biological warfare storage and production facilities. As a subset of an interagency working group headed by DIA, the tiger team was awarded the National Intelligence Meritorious Unit Citation by the Director of Central Intelligence. Most recently, Lt Col Mayer was the Commander, 615 Air Mobility Support Group, Provisional, responsible for restructuring the concept of air mobility and Global Reach into the Pacific. He is a graduate of the Air War College, class of 1995.

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### PROLOGUE--4 January

This is a CNN special report. This just in. The Center for Disease Control has just declared that an epidemic is widespread in Miami, Florida. Doctors have not yet diagnosed the specific cause for the rampant disease, but the illness initially resembles a chest cold and then appears to progress into pneumonia-like symptoms. It progresses rapidly into fever and shortness of breath. What is especially peculiar about this epidemic is that all the patients who have sought medical attention attended the Orange Bowl football game on New Year's Day. Authorities have asked that anyone who went to that game seek medical care if you have cold-like symptoms. Stay tuned to CNN for further developments on this story. Elsewhere in the news ...

## THE BIOLOGICAL WARFARE STORY

This is a notional, yet frightening illustration of what the first signs of a biological warfare (BW) attack might sound like. This scenario is a plausible example of an attack a terrorist or deranged person might conduct using off-the-shelf technology and readily available biological warfare agents. The “concept of operations” in this attack consisted of using several insect bombs (the kind you push the button, it starts spraying, and you leave the house for two hours) and modifying them by filling the canister with anthrax bought through a mail order specimen company in the United States. If that doesn’t sound credible, please note that Saddam Hussein bought his original anthrax culture from a mail order house in the United States and had it shipped overnight mail!<sup>1</sup> This is just a sample of many plausible scenarios that could employ biological warfare agents in a terrorist or combat operation. The recent chemical warfare attack in the subways of Tokyo is a glaring example of just how susceptible modern society is to these kinds of insidious attacks. It doesn’t take a great deal of imagination to conceive of other situations and vulnerabilities that would make very lucrative targets for a biological weapons strike. If an attacker has access to the target area, a simple mechanism to aerosolize a substance, and a basic biology laboratory, the prerequisites are complete. This is not a high-tech arena that requires specialized equipment or core material as nuclear weapons require; this is basic college biology coupled with motivation. While



this weapon has not been prevalent in recent years, the threat is real, the United States vulnerability is clear, and the ability to counter the biological weapon is almost nil.

A study of biological warfare raises some fundamental questions.

- Just what is biological warfare?
- What is the history of biological warfare and how important is it today?
- What biological warfare agents are available for use today?
- What is the biological warfare threat?
- How capable are we of coping with the threat?
- What policy should the United States follow to close the gap between the threat and the capability?

The intent is to raise the awareness level about a very real and probable threat that has not been dealt with effectively. This article hopes to bring the issue to the front burner for study and to apply resources to resolving the tough problems. While the paper identifies where precious resources should be focused, it does not profess to have all the answers to very difficult technical and political questions about the biological warfare dilemma.

First, what is biological warfare in layman's terms? From a military perspective, it is the intentional use of diseases to affect an adversary's military force, population, crops, or livestock. Certainly, a terrorist biological campaign could target those same kinds of objectives, depending on the perceived purpose of the terrorist. There are two basic categories of biological warfare agents. Microorganisms are living organic germs, e.g., anthrax (*bacillus anthracis*). Second, toxins are the byproducts of living organisms, or effectively natural poisons, e.g., botulism (botulinum toxin) is a byproduct of growing the

microorganism *Clostridium botulinum*.<sup>2</sup> These are only two examples of biological warfare agents, although these are especially prevalent and virulent examples. There are many other natural and man-made agents that have been used throughout history.

## HISTORICAL PERSPECTIVE

Biological warfare is not a twentieth century development; it has been an effective combat weapon for centuries. As early as 1346 A.D., Tartars held the walled city of Kaffa under siege and catapulted plague-infested bodies into the city.<sup>3</sup> Were the Tartars successful in using disease as a means to break the siege? Not only did illness cause Kaffa to capitulate, but some medical historians speculate this event resulted in the bubonic plague epidemic that spread across medieval Europe between 1347 and 1351, killing 25 million people.<sup>4</sup> Three hundred years later, during the French and Indian War, the English offered blankets to Indians that were holding Fort Carillon. The English suspected the Indians were loyal to the French and exposed the blankets to the smallpox virus before their apparent altruistic overture. The Indians began to fall ill, and after an epidemic spread through the fort, the English attacked, defeating the incapacitated force of Indians. The British gained control of Fort Carillon and renamed it Fort Ticonderoga.<sup>5</sup>

Through the years, there are many examples of using natural diseases in war to place an adversary in a position of disadvantage. For example, dumping bodies into water supplies has been fairly common throughout history. Two thousand years ago, Romans fouled many of their enemy's water sources by throwing the corpses of dead animals in the wells.<sup>6</sup> During the American Civil War, Confederate soldiers shot horses and other farm animals in ponds in an effort to contaminate the water supply of the Union forces.<sup>7</sup>

While there was some evidence of biological warfare in World War I<sup>8</sup>, the interwar years saw a new interest in the use of disease as a weapon. Paradoxically, probably the two most active programs started as a result of an international initiative to ban biological warfare agents. Both Japan and the United Kingdom recognized that since biological warfare was horrifying enough to outlaw, it probably would make an effective weapon. Both countries had very robust programs as early as 1932 and 1934 respectively.<sup>9</sup> There is evidence that Japan tested biological warfare agents on prisoners of war and that they actually used them on the population against China.<sup>10</sup> They dropped debris that was infested with fleas that carried the plague over 11 cities in mainland China. The result was a bubonic plague epidemic in China and Manchuria.<sup>11</sup> While these attacks caused casualties, the weapons did not function reliably and ultimately resulted in very little strategic impact that affected the war.<sup>12</sup> Nevertheless, reports of this effort stimulated an aggressive British program.

When Great Britain learned of the Japanese biological warfare program, they put significantly more emphasis toward developing their own BW capability. Most of their testing was conducted on an island off the northwest coast of Scotland called Gruinard. They concentrated their development and testing efforts on the lethal effects of anthrax. Scientists used sheep as victims to evaluate the effectiveness of the disease, and they infected literally thousands of animals with anthrax. As a result of the huge amount of anthrax agent dispersed on the island and the large number of sheep infected, the British could not effectively decontaminate the island after they stopped the testing program.

Consequently, Gruinard is still considered contaminated and is off limits, demonstrating the persistence of anthrax as a biological weapon.<sup>13</sup> The British soon combined their biological weapons development efforts with the Canadians and the United States. Even though there were Allied operational plans to employ biological weapons during World War II, there is no evidence to indicate they were actually used on a large scale. There is, however, strong evidence that Reinhard Heydrich, chief of the Nazi security service, was assassinated with a grenade that had been contaminated with biological warfare agents (typhoid fever).<sup>14</sup>

### BW in the Cold War

After World War II and during the Korean War, the focus, at least from the United States perspective, was on building a BW retaliatory capability. An anti-crop bomb was developed, tested, produced, and delivered to the Air Force in 1951 that could have attacked North Korean rice fields, reducing a significant source of nutrition for the population.<sup>15</sup> North Korea accused the United States of using biological agents during the Korean War, however the United States denied the accusation and there was no substantive proof offered in the open literature.<sup>16</sup>

Following the Korean War, the United States invigorated the biological warfare program in 1956 after Marshal Zhukov announced to the Soviet Congress that chemical and biological warfare weapons would be used as weapons of mass destruction in future wars. This was a dramatic shift in Soviet policy and the Cold War philosophy.<sup>17</sup> The fundamental concept of United States' biological warfare operations changed as a result.

During Korea, the biological capability was maintained primarily for retaliation in the event an adversary employed a biological agent against United States or allied forces. The prevailing philosophy was that the threat of retaliation in kind would deter the use of these kinds of weapons. After the new Soviet pronouncement, the United States concept changed to employment upon executive order by the President of the United States.<sup>18</sup> Effectively, this mimicked the Soviet position, implying that the United States may use biological weapons in situations other than straightforward retaliation. This boosted the biological warfare research effort in the United States. The bulk of the research was conducted at Fort Detrick in Maryland. It was during this "boost phase" that the United States' vulnerability was clearly demonstrated with simulated covert biological warfare attacks on at least three cities' subway systems. Surrogate biological agents were introduced into the air vents of the underground systems. Samples were then taken determine how widespread the dissemination would be. The results demonstrated that large numbers of the populace would be exposed to infectious doses under such an attack.<sup>19</sup> This supported a similar test that took place in 1950 when an aerosol cloud of simulated biological agent was sprayed off the coast of San Francisco. The test results showed that nearly 100 percent of the population had inhaled potentially lethal doses.<sup>20</sup>

In 1969, President Nixon changed the United States' policy on biological warfare. During a visit to Fort Detrick, he announced that the United States was terminating research on biological warfare and was unilaterally disarming any capability to conduct offensive biological warfare. By 1972, the United States biological weapons stockpile

was completely destroyed.<sup>21</sup> This gesture by the United States was the catalyst for the world community to embrace the Biological and Toxin Weapons Convention (BWC). A total of 118 countries (including USSR and Iraq) signed up to abide by the BWC which directs that the signatories will “never in any circumstances develop, produce, stockpile, or otherwise acquire or retain any biological weapons.”<sup>22</sup>

During this time, the Vietnam War was raging. However, there is no indication that biological warfare agents were used in this conflict. Agent Orange, a herbicide, was a chemical-based agent that saw wide use, but biological weapons *per se* were not used.<sup>23</sup>

While the United States biological warfare program was flourishing and even after unilateral biological warfare disarmament, there is evidence that the Soviet program was thriving although they had signed the BWC in 1972. In the late 1970s and early 1980s, there are reports that the Soviets used biological weapons in Laos, Kampuchea, and Afghanistan. While widely reported as a program called Yellow Rain, these allegations were never proven.<sup>24</sup> In 1978, Georgi Markov, a popular writer and exile from Bulgaria, was walking to the BBC in London where he broadcast to his homeland from Radio Free Europe. As he was walking, he suddenly felt a sharp pain in his leg. Turning around, he confronted a man picking up an umbrella. The man apologized and went on his way. Markov took ill that night and died several days later. The autopsy found a small metal pellet coated with ricin, a biological toxic substance derived from the castor oil plant.<sup>25</sup> Another incident occurred in April, 1979 when a loud explosion was reported from a research compound in Sverdlovsk, USSR. Over the next few days, reports surfaced of an

outbreak of anthrax. The United States claimed that the outbreak was the result of an accident in a biological warfare production plant. The USSR vehemently denied the accusations, claiming it was caused by tainted, black-market meat and poor hygiene among the population. In the media and technical literature before 1992, many Western journalists and scientists argued that the facts supported the Soviet claims.<sup>26</sup> However, in 1992, Russian President Boris Yeltsin admitted that the Sverdlovsk incident was actually a biological warfare accident involving anthrax.<sup>27</sup> Thereafter, President Yeltsin signed a decree that recommitted Russia to the Biological and Toxin Weapons Convention. But in 1994, three defectors revealed an ongoing Russian biological warfare program that concentrates on a “superplague” for which, reportedly, the West has no antidote. President Yeltsin claimed he didn’t know about any biological warfare programs. The defectors verified his claim and inferred that the military is running the program without Yeltsen’s knowledge or consent.<sup>28</sup>

### Biological Terrorism

In 1984, the French authorities made a startling discovery that demonstrates how vulnerable the world is to biological warfare terrorism. The Paris Police raided a residence suspected of being a safe house for the German Red Army Faction. As they conducted their search, they found documents that revealed a strong working knowledge of lethal biological agents. As the police continued the search to the bathroom, they came across a bathtub containing many flasks filled with what turned out to be *Clostridium*



*botulinum*, the microorganism that produces botulism, one of the most lethal biological substances known to man.<sup>29</sup>

On 20 March 1995, the Tokyo subway system was attacked with chemical warfare agents by, allegedly, a cult called the Aum Shinri Kyo or the "Supreme Truth." This incident killed at least 11 people and injured as least 5,500 others.<sup>30</sup> Five different subway cars were struck simultaneously by individuals leaving canisters dispersing a Nazi-developed nerve agent called sarin.<sup>31</sup> This is an exceptionally significant event because it strikes at the core of society with furtive lethal gases, exposing glaring vulnerabilities and fomenting terror among the population. As one victim of the subway attack said, "We're just innocent, ordinary people. It frightens me to think how vulnerable we are."<sup>32</sup>

On the 28th of March, Tokyo police found large quantities of *Clostridium botulinum* during one of several raids on Aum Shinri Kyo facilities.<sup>33</sup> This discovery clearly demonstrates that a terrorist organization had the resolve, the biological agent, and the wherewithal to conduct a horrendous biological attack against an unprotected population. As *Time Magazine* said, "... garden-variety madness had got access to weapons of terror."<sup>34</sup>

### BW and the 1991 Gulf War

These recent world biological warfare events have been alarming, but what really brought the biological warfare issue into the spotlight of the public's eye was the experience in DESERT STORM, the Persian Gulf War. By the time of the Iraqi invasion

into Kuwait, it was widely acknowledged that Iraq had a biological warfare program, concentrated on very toxic botulinum toxin and very resilient anthrax.<sup>35</sup> This assessment is derived from a compilation of several sources and indicators, the most dramatic being an Iraqi defector who was a microbiologist. He told a British newspaper correspondent that as early as 1983 Iraqi scientists were developing and testing biological warfare agents.

There were many strains, botulism, salmonella, and anthrax. Friends told me they had found a way to make anthrax even more toxic. I know they experimented on sheep with *Clostridium botulinum* type C (the source of Botulinum toxin).<sup>36</sup>

The defector said he personally had done research and solved difficult technical problems relating to the weaponization and deployment of biological warfare agents.<sup>37</sup> On 2 August 1990, when Iraqi army invaded Kuwait, the Iraqis had spent close to \$100 million on their offensive biological warfare program and had a significant stockpile of biological warfare agents.<sup>38</sup> Saddam Hussein announced "loud and clear" that this war would be the "mother of all wars," implying a no-holds-barred engagement.<sup>39</sup> This was the first time since World War II that the United States had faced a military adversary with a highly probable biological warfare capability and the resolve to use it.<sup>40</sup>

The United States was challenged with not only how to protect the military forces, but how to preempt the use of Saddam's biological warfare arsenal. Plans for force protection included protective equipment and vaccinations against probable biological warfare threats.<sup>41</sup> In addition, planners were challenged to determine a mechanism to destroy the biological warfare stockpiles before Saddam could deploy them. Dropping a

precision-guided bomb on the suspected storage bunkers would have been easy enough. The real challenge was destroying the viability or utility of the biological weapons without spreading the agents and causing massive collateral damage in terms of human lives. The military was simply not prepared for this eventuality. Several tests were conducted over a very short time to try to find the right kind of enhanced munition or bomb that would render the biological warfare agent unusable to the Iraqis and not release the viable lethal agents into the atmosphere. The crash program was not fruitful. However, in the effort, computer modeling showed that the design of the suspected biological weapons storage bunkers offered a bombing approach that might inhibit the release of the agents. In the eleventh hour, this concept detailing specific fusing, type of bomb, and angle of attack was telephoned to the CENTCOM planners in Riyadh.<sup>42</sup> All suspected bunkers were attacked, and there was no confirmed collateral damage as a result of released biological agent. There was, however, one unconfirmed news report of several incidents of illness and death in Iraqi guards after the coalition bombed a biological warfare facility in Baghdad.<sup>43</sup>

In the end, it appears that Saddam Hussein did not use biological weapons during DESERT STORM. While the Iraqi rationale may never be known for certain, it is likely that they were deterred by public signals like the one Secretary of Defense Dick Cheney announced during a news conference on 23 December 1990:<sup>44</sup>

. . . were Saddam Hussein foolish enough to use weapons of mass destruction, the US response would be absolutely overwhelming and it would be devastating.<sup>45</sup>

In an even more direct and unambiguous message, a 5 January 1991 letter that President George Bush sent to Saddam Hussein said:

The United States will not tolerate the use of chemical or biological weapons... The American people would demand the strongest possible response. You and your country will pay a terrible price if you order unconscionable acts of this sort.<sup>46</sup>

After the cease fire, Iraq admitted having a biological warfare program that they said had only progressed to the research stage. Inspectors found evidence of a robust biological warfare production capability, but could not specifically link it to the biological warfare program. However, there was overwhelming circumstantial evidence that an offensive biological warfare production and weaponization program did exist.<sup>47</sup> Like the Soviet Union, Iraq had previously signed up to the BWC. The bad news is that United Nations inspectors were not able to locate Saddam's biological stockpile.<sup>48</sup> Having witnessed the bold Iraqi deceptive effort regarding their nuclear research program, there is every reason to believe that Saddam Hussein still has a large amount of biological warfare agents at his disposal today.<sup>49</sup> On 24 February 1993, the former CIA Director, James Woolsey, told the Senate Governmental Affairs Committee:

Iraq's biological weapons capability is perhaps of greatest immediate concern. Baghdad had an advanced program before DESERT STORM, and neither war nor inspections have seriously degraded this capability. The dual-use nature of biological weapon equipment and techniques makes this the easiest program to hide.<sup>50</sup>

## **THE BIOLOGICAL WARFARE THREAT**

With the public exposé of active Russian and Iraqi biological warfare programs, the threat of these weapons looms large on the horizon. There are official, open-source estimates that between 10 and 20 countries either have, want, or are thinking about starting a biological weapons capability.<sup>51</sup> However, there is more to the threat than just countries that have the capability. What types of agents are a threat and how will they mature given new technology? And, does the insidious nature of biological agents pose a threat?

### **BW Nation States**

Some of the countries suspected in open sources of having or wanting a biological warfare program include the former Soviet Union, Syria, Iraq, Iran, Libya, North Korea, Israel, Egypt, Cuba, Taiwan, China, Romania, Bulgaria, Pakistan, India, and South Africa.<sup>52</sup> There are a few real concerns with this list. First, at least a few of these nations have been associated in the past with state-supported terrorism. This fact raises the probability of a biological warfare terrorist attack. Second, many of these countries reside in regions of historical instability and many others are in regions of emerging instability. And third, with the demise of the Soviet Union and economic distress in the former Soviet Union, there is a possibility that their biological warfare weapons experts will look for more prosperous employment by building a biological warfare program

elsewhere for the highest bidder. Fortunately, the CIA has no indication yet that this biological warfare brain drain is occurring.<sup>53</sup>

### Biological Warfare Technology

The degree of sophistication of each country's research program will determine how advanced their biological agents will be. Even the most rudimentary program will likely have very lethal agents that have been a threat for some time. Botulism and anthrax (mentioned earlier) are high-probability candidates that are difficult to reckon with. In addition, the revolution in biotechnology may produce other agents that are even more toxic and resilient. Without getting into the technical aspects, relatively minor molecular adjustments may produce a more toxic, fast acting, and stable biological agent.<sup>54</sup> There is also a possibility that genetic engineering may produce a weapon that is unique and can only be protected with a unique vaccine.<sup>55</sup> These two examples of potential developments in biological warfare will give this weapon a great deal more utility, especially on the battlefield. A more stable agent that produces an accelerated reaction would provide the tactical commander with a viable tactical weapon.

Additionally, if the commander could deploy biological agents against an enemy while friendly troops remained invulnerable, the biological option would become much more attractive as a battlefield weapon. There is also some speculation that a toxic agent could be produced that would target only a specific genetic makeup, giving an attacker the capability to discriminate among age, gender, racial or behavior groups as target sets.<sup>56</sup>

Following the Tokyo subway attack, it has come to light that the Aum Shinri Kyo had

recently ordered sophisticated molecular design software. The purpose of this type of software is to reengineer the molecular structure of chemicals or microorganisms to make them stronger or more dangerous.<sup>57</sup> Could it be that this fanatic cult was planning to use this software to genetically reengineer their biological or chemical agents?

### Stealthy BW

Now the really sobering part--biological warfare agents are very difficult, if not impossible to detect while they are in the research, production, transit, or employment phases. Normal biological warfare research facilities are completely common with completely legitimate biotechnical and medical research facilities. The same production facilities that can produce biological warfare agents may also produce wine and beer, dried milk, food, and agricultural products.<sup>58</sup> The challenge this presents is in distinguishing legitimate production plants from illicit one. It becomes nearly impossible to identify the locations and facilities that are actually producing biological warfare weapons in order to confidently highlight a violation of the BWC or, if necessary, should all peaceful remedies fail, preemptively strike a biological weapons production or storage facility. In addition, biological warfare agents are virtually undetectable while they are in transit. In other words, if a terrorist wanted to carry the biological agent into the United States in a carry-on bag or checked luggage, there is no mechanism to identify the agent using routine customs, immigration, drug scan, or bomb search procedures. The only way to find it would be a physical search by a very well trained and very lucky searcher.<sup>59</sup> Similarly, the threat on the battlefield is almost as insidious, with very little

present detection capability. DESERT STORM represents a recent experience where the United States needed the ability to detect biological warfare agents in order to give early warning for protective measures. With very few exceptions, the capability wasn't there. The very limited capability that was deployed was the result of a crash program to produce a biological detector--it was an experiment.<sup>60</sup> It seems logical that the inability to detect and thereby protect the civilian population or military force would significantly add to the viability of biological weapons as a terrorist or tactical battlefield threat.



## SHORTFALLS

In addition to the detection shortfall, the United States is unable to effectively protect the military forces (medically and non-medically), conduct an effective preemptive counteroffensive strike, or protect the population against a terrorist attack. Given the wide spectrum of kinds of agents that make up the biological warfare threat, medical prophylactic measures (primarily vaccinations) are inadequate, and it appears they will be so at least for the near-term.<sup>61</sup> Personal protection in a biological warfare environment currently depends on protective clothing--the chemical warfare suit. In DESERT STORM, the chemical warfare suit was adequate if fitted properly (a frequent problem) but unsuitable if worn for long durations or while in hot weather.<sup>62</sup> DESERT STORM also highlighted the shortfall in the ability to strike a biological warfare storage facility with confidence that massive numbers of innocent civilians would not be killed (collateral damage) as a result.<sup>63</sup> The United States is impotent to prevent a biological warfare terrorist attack against the population unless there is specific intelligence to forewarn of the attack.<sup>64</sup> Additionally, following a biological warfare attack, there are many agents that medicine can't treat today.<sup>65</sup>

Given this discouraging information, the scenario described in the prologue seems even more plausible. Other "concepts of operations" are not hard to imagine. Nearly every grocery or drug store sells small aerosol deodorizers that periodically spray a fragrant mist. If an adversary wanted to neutralize the military brainstem of the United

States, they might refill these deodorizers with a biological agent and clandestinely place one in each restroom in the Pentagon. After a few days, the entire population of the Department of Defense headquarters would be incapacitated, causing mass confusion and widespread terror.

In a combat environment, conventional dispersal with bombs, artillery, or even a spraying device on an aircraft (like a crop duster) would not be nearly as effective as a more surreptitious attack that would infect people before they donned protective clothing. An infiltration by special operations forces or undercover operatives to place aerosol canisters similar to the insect bombs or deodorizers might cripple a force before it knew it was attacked. Like the Indians at Fort Ticonderoga, the force would fall ill and many would die. But their ability to conduct effective combat operations would certainly be negated. By the time doctors diagnosed the disease and determined the right antidote, if there was one, the war could have been lost.

Consider the implications if the Aum Shinri Kyo had used botulinum toxin or anthrax instead of the sarin chemical agent in their attack on the subway system in Tokyo. The death count and the magnitude of the terror would have been higher by orders of magnitude. There may have been as high as a 90% fatality rate instead of 0.2% actually experienced--that could be nearly 5000 dead innocent civilians! And considering that the volume of sarin to saturate a given area is approximately equivalent to 10,000 times the amount of botulinum toxin needed to cause the same effect, the attack could have been vastly more devastating.<sup>66</sup>

In another recent real-world incident, consider how much more effective the terrorist bombing of the New York World Trade Center would have been if they had placed a fire extinguisher filled with a biological agent at the bottom of each stairwell and rigged them to begin spraying just as the bomb ignited. In the ensuing panic, thousands of occupants of the building escaped down the stairs. No one would consider a fire extinguisher out of the ordinary in a crisis situation after the bombing. As a result, potentially every occupant in the World Trade Center would have been infected. If the intent of the terrorists was to demonstrate how vulnerable the population of the United States is, the addition of biological agents to the conventional attack would really have terrified leaders and other citizens in the United States.

These incidents of potential biological terrorism must raise concern and questions about civilized society's ability (or more accurately, inability) to deal with such an eventuality. As we enter the 21st century, we may well be facing weapons of mass destruction used, not on the battlefield by warriors, but among dense population centers by deranged non-nation states. A sobering prospective. Clearly, more has to be done to overcome this dramatic vulnerability--and soon.

## RESOLUTION

This is a challenge for the diplomatic, technical, military, medical, and intelligence communities, but the political arena may hold the biggest stick to deter biological warfare use. The BWC is the international vehicle to prevent biological proliferation.

Unfortunately, it does not provide for verification or punitive measures.<sup>67</sup> With the blatant violations of Russia and Iraq, much tougher verification protocols and stronger teeth must be built into the BWC. This is especially challenging given that the dual-use technology that produces biological agents gives the biological warfare producer an almost built-in plausible deniability.

The technical community has the greatest and most urgent challenge to develop effective detectors, both on the battlefield and in biological warfare detectors similar to metal detectors. This effort should be a top priority. There should also be technological exploration, in concert with the intelligence community, for means to detect clandestine biological production facilities. The state-of-the-art must be pushed to find some means to detect a production facility with certainty, no matter the size. Both human intelligence and the national technical means must be greatly improved.

The military challenge is to train and equip to respond to a detected biological threat. To respond on the battlefield, they must develop effective, comfortable, and long wearing protective clothing to replace the existing ensemble. A self-contained, air conditioned unit would be ideal. The military must also be capable of responding to a

more strategic biological warfare threat--the production facilities and stored munitions. They must work with the technology community to develop a capability to bomb a biological warfare target and destroy the viability of the agents before they can be brought to bear on friendly forces and without causing unacceptable levels of collateral damage. For obvious political reasons, such precision-guided munitions should, also, be kept non-nuclear. The military also should hone their special operations direct action skills for the biological (as well as chemical and nuclear) mission. The special operation option may be a more plausible alternative depending on the scenario.

The medical community should continue to work on biological warfare vaccinations that are broad-based, safe, and in sufficient quantities to inoculate those people most susceptible to biological warfare attacks. This daunting task will be even more challenging given the controversy about the vaccines administered during DESERT STORM and their suspected connection with the Gulf War Syndrome.<sup>68</sup> They should also strive to improve the post-attack treatment in terms of rapid diagnosis, effective medical treatment, and a responsive surge capability to administer to large numbers of biological warfare-exposed patients.

The intelligence community must be robusted and sensitized to gather data on the biological warfare threat. More resources should be directed toward identifying biological warfare threats by human and national technical means. This is especially important to deter terrorism in the interim until human intelligence and national technical means can provide more definitive answers about who are the have's and have not's.

Finally, United States' and allied political leadership should articulate a clear retaliatory policy against the use of any weapons of mass destruction. This was an effective deterrent on both sides during the Cold War, and it appears to have deterred Saddam Hussein during DESERT STORM. Perhaps even more importantly, this policy must be supported by unrelenting resolve to actually carry out the retaliation.

This is obviously not an easy problem to fix, and this article doesn't claim to have the answers or a cookbook solution. Clearly, however, there is not enough emphasis being placed on a dangerous vulnerability. The first step must be civilian leadership recognizing the predicament and prioritizing the efforts to come to terms with it.

Since this is an issue that crosses many government agency borders, the direction of the effort should come from a multi-agency steering group. This steering group initially should include principals or primary deputies from the office of the White House, Department of Defense, Federal Emergency Management Agency, Public Health Service, Central Intelligence Agency, and Department of Justice. Well versed technical and operational advisors will be essential to steer the effort effectively.

Many of these agencies already have ongoing programs to address their part of the puzzle, but there is little senior-level cohesion to these fragmented endeavors. Additionally, some of these efforts have demonstrated blatant parochialism in an attempt to boost small empires rather than making gains to fix the problem. A multi-agency steering group would overcome these stovepipe attitudes and efforts, placing emphasis on national interests and prioritizing accordingly.

## CONCLUSION

Biological warfare has been a threat for decades if not centuries. Yet, the United States is ill-prepared to defend against or counter it--why? One view is that "... the United States has a tendency to wish the problem would go away because it seems too unsavory and too difficult to handle."<sup>69</sup> Another skeptic says "We don't need it (BW defense) because we have a treaty."<sup>70</sup> It seems the real issue is the apparent imbalance between demonstrated threat versus resources expended to meet that biological warfare threat. In the case of biological warfare, the fixes are technically difficult and they will not be low cost. Weigh this against a threat that has not yet fully manifested itself. It almost seems logical why decision makers would be reluctant to spend scarce resources against a heretofore invisible threat. However, the United States is moving toward a more aggressive counter-BW program. In February 1995, the White House published a national security strategy that said:

... U.S. forces must be prepared to deter, prevent and defend against their use. ...<sup>71</sup>

... The United States will retain the capacity to retaliate against those who might contemplate the use of weapons of mass destruction, so that the costs of such use will be seen as outweighing the gains. However, to minimize the impact of proliferation of weapons of mass destruction on our interests, we will need the capability not only to deter their use against either ourselves or our allies and friends, but also, where necessary and feasible, to prevent it. We are placing a high priority on improving our ability to locate, identify, and disable arsenals of weapons of mass destruction, production and storage facilities for such weapons, and their delivery systems.<sup>72</sup>

. . . To minimize the vulnerability of our forces abroad to weapons of mass destruction, we are placing a high priority on improving our ability to locate, identify and disable arsenals of weapons of mass destruction, production and storage facilities for such weapons, and their delivery systems.<sup>73</sup>

This is a step in the right direction, but it needs to be a giant step. The biological warfare threat looms. The United States must have the capability to detect, preempt, and protect before someone strikes us or our allies with a poor man's nuke.



### EPILOGUE--9 January

This is a CNN special report live from the Anthrax Task Force Center Miami. This morning, the fatality count was 16,437. This grim figure was just given to us by doctors here. Unfortunately, they said the number was going to increase dramatically because so many patients are close to death right now. Doctors are working frantically to save as many as possible, but they are running out of antibiotics and facing massive overcrowding. The halls are crowded with gurneys and relatives are being asked to wait outside unless their loved one is critical. And there are many of those.

The Anthrax Task Force was quickly assembled on the sixth of January after doctors across the nation diagnosed the horrible epidemic as Pulmonary Anthrax. The Federal Emergency Management Agency heads the team that consists of representatives from the FBI, the Center for Disease Control, the Armed Forces Military Intelligence Center, and the US Army Research Institute of Infectious Diseases, to name just a few. They are warning anyone who attended the Orange Bowl on New Year's Day to seek medical attention immediately. If you are experiencing cold-like symptoms, you are probably infected. Do not hesitate. It will be fatal.

The FBI reports that this appears to be a deliberate act of mass murder. But, that is all they have been able to determine. They are offering a ten million dollar reward for any information about this horrendous crime.

That is all from Miami. Back to CNN Center.

## NOTES

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- <sup>9</sup> Harris, p. 75-81.
- <sup>10</sup> Harris, Sheldon H. *Factories of Death, Japanese Biological Warfare 1932-45 and the American Cover-up*. New York: Routledge, 1994, pp. 113-131.
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- <sup>13</sup> Harris, R., pp. 68-74.
- <sup>14</sup> *Ibid.*, pp. 88-93.
- <sup>15</sup> Bailey, p. 15.
- <sup>16</sup> Harris, R., pp. 162-163.
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- <sup>19</sup> Bailey, p. 17.
- <sup>20</sup> Tucker, p. 18.
- <sup>21</sup> Bailey, p. 19 and McDermott, Jeanne. *The Killing Winds, The menace of Biological Warfare*. New York: Arbor House, 1987, pp. 30-32.
- <sup>22</sup> Harris, R., pp. 171-172 and Tucker, pp. 6-7.
- <sup>23</sup> McDermott, pp. 189-190.
- <sup>24</sup> Cole, Leonard A. *Clouds of Secrecy, The Army's Germ Warfare Tests over Populated Areas*. New Jersey: Rowman & Littlefield, 1988, pp. 107-119 and Rose, Stephen. "Coming Explosion of Silent Weapons." *Naval War College Review*, Vol 42 (Summer 1989), pp. 26-27.
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- <sup>26</sup> Cole, p. 131, Harris, R., pp. 220-222 and McDermott, pp. 37-44.
- <sup>27</sup> Bailey, p. 12
- <sup>28</sup> *The Honolulu Advertiser*, "Report: Russia making 'superplague' germs." Mar 28, 1994, p. 1.
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- <sup>38</sup> *Ibid.*, p. 240.

- <sup>39</sup> United States Department of Defense, Office of the Secretary of Defense. *Conduct of the Persian Gulf War, Final Report to Congress*, p. 639.
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<sup>62</sup> United States Department of Defense, Office of the Secretary of Defense. *Conduct of the Persian Gulf War, Final Report to Congress*, pp. 639-646.

<sup>63</sup> Rose, p. 85.

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<sup>65</sup> Bailey, pp. 62-63.

<sup>66</sup> Ibid., pp. 40-41.

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<sup>72</sup> Ibid.

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